

**PB97-963104
EPA/541/R-97/006
November 1997**

**EPA Superfund
Explanation of Significant Difference
for the Record of Decision:**

**Groveland Wells (No. 1 & 2 Site),
(Source Control Operable Unit), (O.U. 2),
Groveland, MA
11/15/1996**



FINAL EXPLANATION OF SIGNIFICANT DIFFERENCES

I. INTRODUCTION

This document constitutes a Final Explanation of Significant Differences ("ESD") between the remedial actions as specified in the Record of Decision ("ROD") and those now planned under this ESD. It also documents the conditions that give rise to its need.

Site Name, Location, and Description

Site: Source Control Operable Unit (ou 2)
Groveland Wells Nos. 1 & 2 Site

Site Location: Groveland, Massachusetts

Site Description: The Groveland Wells Nos. 1 and 2 Site contains nearly 850 acres mostly located in the western part of the Town of Groveland. Both of the town's municipal wells, i.e., Stations Nos 1 & 2, were closed in 1979 when high concentrations of trichloroethene ("TCE"), a volatile organic compound ("VOC"), were discovered.

The closure of the wells resulted in investigations that revealed the presence of an extensive groundwater contaminant plume, containing principally TCE, that is migrating toward the Merrimack River. Highest TCE contaminant concentrations have been found near the Valley Manufactured Products Company/Groveland Resources Corporation ("Valley/GRC") property which is located at 64 Washington Street, Groveland, Massachusetts.

In addressing the cleanup of the groundwater contamination, the Groveland Site was divided into operable units. The apparent source of the groundwater contamination is the Valley/GRC property, hence the property is considered the Source Control Operable Unit for the Groveland Site. Remediation of the remainder of the migrating contaminant plume is being addressed under the Management of Migration Operable Unit. This Final ESD is for the Source Control Operable Unit, i.e., the Valley/GRC property.

The Valley/GRC property consists of approximately 1.5 acres of land on the southwest corner of the Groveland Site. This property has one 29,000 square foot building and several subsurface waste disposal systems for dispersal of liquid effluent into the environment.

Valley Manufactured Products Company, Inc., which operates on the GRC property, is a screw machine products manufacturer and finisher. During the period 1963 to 1974, waste oil and solvent (including TCE) was released by Valley onto the property, including

TCE product which escaped from an underground storage tank. Additional releases resulted from spills or leaks into the subsurface disposal systems and use of waste oil containing TCE as a defoliant.

A more complete description of the Groveland site, the Valley/GRC property, and remediation systems proposed for both operable units, can be found in the "ROD Decision Summary, Groveland Wells Nos. 1 & 2 Site, Valley Site Organics Source-Control Operable Unit, Groveland, Massachusetts" dated September 30, 1988 and in the "Management of Migration Record of Decision Summary, Groveland Wells Nos. 1 & 2 Site" dated September, 1991.

Identification Of Lead And Support Agencies

Lead Agency: United States Environmental Protection Agency (EPA)
Contact: Robert J. Leger
Remedial Project Manager
(617) 573-5734

Support Agency: Massachusetts Department of Environmental Protection (MA DEP)
Contact: Jay Naparstek
Assistant Deputy Division Director
(617) 292-5697

Citation Of The Comprehensive Environmental Response, Compensation And Liability Act Of 1980 ("CERCLA") Section 117© That Requires The ESD

Section 117© of CERCLA sets forth the circumstances for which an ESD is required. Specifically, Section 117© provides: "After adoption of a final remedial action plan - (1) if any remedial action is taken, (2) if any enforcement action under section 106 of this title is taken, or (3) if any settlement or consent decree under section 106 of this title or section 122 of this title is entered into, and if such action, settlement or decree differs in any significant respects from the final plan, the President or the State shall publish an explanation of the significant differences and the reasons such changes were made."

The EPA has determined that certain changes in the remedial action significantly differ from the remedial action originally selected in the September 30, 1988 ROD for the Site. This document describes these differences and the reasons why these changes to the remedy described in the ROD are necessary.

Summary Of The Changes In The Selected Remedy Which Require An ESD

EPA's issuance of this ESD is necessary because of changes in the remedy for the cleanup of contamination in groundwater, as originally specified in the ROD. The changes involve eliminating the requirement to design, install, operate and maintain a groundwater treatment system on the Valley/GRC property, using aeration (air stripping) and carbon adsorption to treat contaminated groundwater. Groundwater will still be extracted from the Valley/GRC property but will not be treated on the property. Instead, the extracted groundwater will be transferred (piped) to a Management of Migration treatment facility to be located adjacent to the Valley/GRC property. This property is presently owned by the Archdiocese of Boston. The contaminated groundwater will subsequently be treated with ultraviolet light/oxidation treatment.

As anticipated in the ROD, a groundwater recovery system will be designed, installed, operated and maintained on the Valley/GRC property. However, the changes discussed in this ESD eliminate the requirement to design, install, operate and maintain a groundwater recirculation system.

These changes do not fundamentally alter the remedy selected in the ROD. Considering the new information that has been developed and the changes that have been made to the selected remedy, the EPA and the MA DEP believe that the remedy remains protective of human health and the environment, complies with Federal and State requirements that are applicable or relevant and appropriate to this remedial action, and is cost-effective. In addition, the revised remedy utilizes permanent solutions and alternative treatment (or resource recovery) technologies to the maximum extent practicable for this site.

Public Information Meeting, Comment Period And Announcement Of Statement That The ESD Will Become Part Of The Administrative Record File

The EPA held a public information meeting on the proposed ESD on August 13, 1996 in the Groveland Town Hall, at 183 Main Street, Groveland, Massachusetts. The EPA also provided a public comment period pursuant to Section 300.825(b) of the National Oil and Hazardous Substances Pollution Contingency Plan ("NCP"), in order to ensure full community involvement. The comment period on the proposed ESD lasted 14 days, commencing August 13, 1996, and ending August 27, 1996. The proposed ESD, this final ESD, a transcript of the public meeting, significant public comments, and responses to comments, are included in the Administrative Record File for the Site.

Addresses Of Locations Where The Files Are Available And Hours Of Availability Of The Files

Information pertinent to EPA's decision making process in publishing this ESD is available for public review at information repositories at the following locations:

EPA Records Center
90 Canal Street, First Floor
Boston, Massachusetts
(617) 573-5729 Hours:
Mon-Fri: 10:00 a.m. - 1:00 p.m.
 2:00 p.m. - 5:00 p.m.
Closed 1st Friday of each month.

Langley-Adams Library
185 Main Street
Groveland, Massachusetts
(508) 372-1732
Hours:
Mon & Wed: 12:00 p.m. - 5:00 p.m.
 6:30 p.m. - 8:30 p.m.
Tues & Thurs: 10:00 p.m. - 5:30 p.m.
Fri: 12:00 a.m. - 5:00 p.m.

II. SUMMARY OF SITE HISTORY, CONTAMINATION PROBLEMS, RESPONSE HISTORY, AND SELECTED REMEDY

Site History and Contamination Problems

The EPA placed the Groveland Site on the National Priorities List ("NPL") in 1982 because the contamination in the municipal wells constituted a threat to public health and the environment. The NPL listing resulted in the initiation of studies that investigated the nature and extent of groundwater contamination, potential sources of the contamination and the pathways by which the municipal wells were contaminated. These investigations identified three possible sources of contamination in the Groveland Site area: (1) the A. W. Chesterton Company; (2) the Haverhill Municipal Landfill; and (3) the Valley/GRC property.

1. A remedial investigation ("RI") was performed on the Chesterton property in 1984 and 1985 pursuant to a Resource Conservation and Recovery Act ("RCRA") Administrative Order. The RI determined that contamination was confined to the Chesterton property boundary and appeared not currently connected to groundwater contaminant plume area or the Stations Nos. 1 & 2 area. Remediation of contamination on the Chesterton property is being dealt with using corrective action and closure activities under RCRA authority.
2. The Haverhill Landfill was originally named as a potential source of contamination which forced closure of Station Nos. 1 & 2. The Landfill was subsequently placed

on the NPL in October 1984 as a separate site from the Groveland Wells site. Cleanup of the Haverhill site is being addressed under a separate CERCLA action.

3. The EPA performed aquifer-wide Management of Migration ("MOM") RI work in 1984 and 1985 and completed supplemental MOM RI work in 1990 and 1991. The RIs investigated the nature and extent of groundwater contamination, potential sources of the contamination and the pathways by which the municipal wells were contaminated. The results of these activities revealed that an extensive groundwater plume, containing principally TCE and 1,2-Dichloroethene ("1,2-DCE"), is migrating toward the Merrimack River. The groundwater contaminant plume extends approximately 3,900 feet north from the Valley/GRC property, paralleling Johnson Creek. Highest contaminant concentrations were found near the Valley/GRC property, with concentrations decreasing with increased distance from Valley/GRC.
4. The Valley/GRC property is considered the Source Control Operable Unit for the Groveland Site. According to Valley employee accounts, as much as 3000 gallons of waste oil and solvent (including TCE) were released on the Valley/GRC property during the period 1963 to 1974. Of this amount, five to seven hundred gallons of TCE escaped from an underground storage tank. The balance of the releases came from spills or leaks into the subsurface disposal systems and use of waste oil containing TCE as a defoliant.

Studies at the Groveland Site have shown that TCE released at the Valley/GRC property has migrated into the aquifer below the property and has extended beyond the boundary of the property to other areas of the Groveland Site.

Response History

1. **Source Control Operable Unit** To remediate contamination within the boundary of the Valley/GRC property, the EPA issued a first Record of Decision (the "Source Control ROD") for the Groveland Site in September of 1988. The Source Control ROD required cleanup of the organic chemical contamination source at the Valley/GRC property and approved an innovative technology consisting of soil vapor vacuum extraction system ("VES") to treat VOC-contaminated soil. The ROD also approved the installation of a groundwater recovery, treatment and reinjection system to treat VOC-contaminated groundwater located directly under the Valley/GRC property.

Pursuant to a Second Amended Administrative Order issued on March 11, 1992, under CERCLA § 106(a), Valley designed a full scale soil vapor vacuum extraction system ("VES") and a groundwater recovery, treatment and reinjection system for use on its property. The EPA approved the Final (100%) Remedial

Design submission on August 24, 1992. However, on October 8, 1992, Valley informed the EPA that they would no longer be able to comply with the Administrative Order. On November 2, 1992, the EPA issued a Notice of Failure to Comply with the Administrative Order.

During a site visit to the Valley/GRC property on December 17, 1992, Valley informed the EPA that all of the necessary soil vapor vacuum extraction wells and vapor probes had been installed in accordance with the approved 100% design, and that the VES system is presently operating continuously 24-hours a day. On January 20, 1993, the EPA issued a Second Notice of Failure to Comply with the Administrative Order for failure to submit monthly progress reports concerning the VES system's progress to date in terms of sampling, monitoring, and performance data; the amount of contaminants removed to date; and estimates of contaminants remaining in the soil. However, the EPA is assuming that the PRP will continue to address subsurface soil contamination until subsurface soil cleanup goals are achieved.

Because of non-compliance with the Administrative Order, further remedial design/remedial action activities related to groundwater remediation at the Valley Site is being accomplished by the EPA using Fund monies. The EPA has engaged a contractor to perform the remedial design work for the groundwater recovery and treatment system.

The Source Control ROD also required that all drains and lines to the Brite-dip subsurface disposal system be effectively sealed and disconnected. In a letter dated March 21, 1991, Valley/GRC certified to the EPA that all drains and lines to the Brite-dip surface disposal system had been sealed.

2. **MOM Operable Unit** In September 1991, the EPA signed a Record of Decision requiring cleanup of the groundwater contaminant plume and on May 15, 1992 the EPA issued an Administrative Order requiring the potentially responsible parties ("PRPs", i.e., Valley/GRC) to remediate the groundwater contamination.

On June 22, 1992 the PRPs responded that they would not be able to comply to the requirements of the Order and on August 19, 1992 the EPA issued a Notice of Failure to Comply with the Administrative Order. The EPA is now using Superfund monies and has engaged Metcalf and Eddy to perform the remedial design work.

ESD for the Management of Migration Operable Unit ROD

Attached to this document is a summary of information on the Management of Migration ("MOM") Operable Unit. The information recently gathered on this portion of the site has

given rise to the selection of a remedy which is significantly different from the remedy that was originally selected in the MOM ROD, dated September 1991. The attached MOM ESD discusses activities that were taken to obtain recent groundwater contaminant information for the site. The results of these studies show declines in TCE-contaminant concentrations in wells located north of Main Street. Reductions in the TCE levels were also observed in some of the other wells that were sampled south of Main Street.

Declines in TCE-contaminant levels in some of the wells sampled has caused the EPA to consider reducing the amount of groundwater that will need to be extracted and treated. The EPA has decided to re-design the extraction system and to treat the more highly contaminated portion of the groundwater contaminant plume located at Mill Pond and south of Mill Pond. The remainder of the groundwater contaminant plume will be remediated by natural attenuation.

Summary Of The Remedy As Originally Described In The ROD

The Record of Decision ("ROD"), signed September 30, 1988, described each of the alternatives evaluated in remediating the contamination on the Site, and described in detail the chosen alternative for each contaminated media of the Valley/GRC property as follows:

Soil - design, install, operate and maintain a VES system in the vadose (unsaturated) zone which will intercept laterally and vertically all areas of subsurface soil contamination so as to attain soil cleanup goals in an efficient and expeditious manner. The VES will use carbon adsorption for vapor treatment. Carbon adsorption or equivalent treatment will also be used for the treatment of separator water before being discharged downgradient of the site.

The area of attainment for the soil cleanup goals is everywhere on the Valley site unless it is determined that a contaminant level in soil has been achieved that is not contributing to groundwater contamination above cleanup goals. (The Valley Site means the Valley/GRC property and all property adjacent to but outside the boundaries of the Valley/GRC property where soil contamination is above cleanup levels in the unconsolidated zone above the water table elevation during the operation of the groundwater treatment facility).

Groundwater - design, install, operate and maintain a groundwater recovery/recirculation system in overburden and bedrock. This system will intercept contaminated groundwater on the site in all downgradient directions (east and south) and recirculate a portion of treated effluent upgradient of the site to accelerate removal of saturated zone soil contamination. Recovery/recirculation shall be at high rates that will attain the groundwater cleanup goals everywhere on the Valley/GRC property at every

point in the aquifer. (The Valley/GRC property means the property owned by Groveland Resources Corporation, located at 64 Washington Street, Groveland, Massachusetts).

Design, install, operate and maintain a groundwater treatment system using aeration (air stripping) and carbon adsorption to treat the contaminated groundwater from the recovery system. The extracted groundwater would be pre-treated to remove inorganic compounds and then passed through an air stripping chamber to remove VOCs.

Approximately 30 gallons per minute ("gpm") is anticipated to be recovered from the Valley/GRC property. Optimum recovery rates would be developed through on-site pump tests and other studies during remedial design. A portion of the groundwater that passes through the air stripper (approximately 1.5 gpm of the total 30 gpm) would be filtered through activated carbon to remove residual contaminants and then discharged downgradient of the Valley/GRC property.

Drains and Lines - effectively seal and disconnect all drains and lines to the Brite-dip subsurface disposal system.

III. DESCRIPTION OF SIGNIFICANT DIFFERENCES AND THE BASIS FOR THOSE DIFFERENCES

Summary Of The Information That Gave Rise To Significant Differences From The Selected Remedy As It Was Originally Specified

As anticipated in the Source Control ROD, on-site pumping tests and other studies were performed during remedial design in an effort to evaluate optimum groundwater recovery rates. Accordingly, during the period March 25-April 13, 1994 a pumping well was drilled and installed by EPA's contractor on the Valley/GRC property. Prior to drilling the pumping well, a test boring was advanced in the same location to collect samples for lithologic description, grain size analysis and determination of the presence of pure phase organic compounds. The purpose of these activities was to obtain on-site field data for the aquifer beneath the Valley/GRC property in the vicinity of the proposed extraction system.

On June 19, 1994 a report was submitted by EPA's contractor detailing the results of the aquifer yield investigation. It appears that the maximum amount of water that the aquifer will yield beneath the Valley/GRC property, with and without reinjection, is approximately 6 gpm and 3 gpm, respectively. The relatively low yield of the aquifer is primarily due to two (2) reasons: (1) the aquifer in the unconsolidated zone above the bedrock, is relatively thin, i.e., only about 15 feet thick; and (2) the soils within most of the aquifer are fine-grained and poorly sorted resulting in a low permeability, i.e., the ease with which water will pass through the soils.

It is estimated that a yield of at least 10 gpm would be needed to justify building a groundwater treatment facility on the Valley/GRC property. The low yield of the aquifer is insufficient to justify building such a facility. In addition, because of the low permeability of the soils, reinjection of water upgradient will not significantly increase the aquifer yield to justify building a treatment facility.

Although there appears to be insufficient water to justify building a groundwater treatment facility on the Valley/ GRC property, the EPA has decided to pursue extracting contaminated groundwater at this location. The extracted groundwater will be treated at the Management of Migration treatment facility. Extracting contaminated groundwater beneath the Valley/GRC property will accelerate the restoration of groundwater to drinking water standards and will also lower the groundwater table, subsequently exposing more contaminated soils to the SVE system which is presently being operated by the PRPs.

In conclusion, the relatively thin water bearing zone and low soil permeability has resulted in an unanticipated low yield from the aquifer beneath the Valley/GRC property. These recent findings has caused the EPA to eliminate the requirement to design, install, operate and maintain a groundwater treatment system and a groundwater reinjection system.

Change In Technology

All groundwater extracted from the Valley/GRC property will be transferred (piped) to the Management of Migration treatment facility. The contaminated groundwater will subsequently be treated with ultraviolet light/oxidation ("UV/Oxidation") treatment. This is a change in technology from the air aeration (air stripping) and carbon adsorption treatment specified in the Source Control ROD.

The UV/Oxidation treatment process is actually a two-step process. First, hydrogen peroxide or ozone is added to the water. Subsequently, UV radiation photolyzes (breaks down) the ozone or hydrogen peroxide. This results in the formation of highly reactive hydroxyl ("OH") free radicals. These radicals are important because they are stronger oxidizing agents than either ozone or hydrogen peroxide alone. These hydroxyl radicals then oxidize (take away hydrogen by combining with oxygen) the organic contaminants in the extracted groundwater. Once the organics are completely oxidized, the reaction products would consist of carbon dioxide and water.

The UV/Oxidation process has been known for at least 10 years and has been evaluated under the EPA Superfund Innovative Technology Evaluation ("SITE") program. The process is still considered an innovative technology, mostly because of the small size and number of the existing full-scale treatment units.

Two SITE project evaluations of the UV/Oxidation process revealed that high removal efficiencies can be achieved for VOCs present in groundwater. Both demonstrations attained 99% removal efficiencies for TCE. Treatability testing for the MOM treatment facility has confirmed the feasibility of the UV/Oxidation process for this site and the EPA has subsequently derived design parameters for treating contaminated groundwater for the Groveland site.

The remedy provides for on-site destruction of organic contaminants in groundwater and is a treatment process for organic contaminants that produces virtually no waste residuals. Use of this technology eliminates possible adverse impacts of organic contaminant transport off-site or cross-media contamination. Use of this technology permanently destroys (not merely reduces) virtually all organic contaminants in the extracted groundwater.

Remediation of the contaminant plume under the MOM operable unit is accomplished by designing, installing, operating and maintaining a groundwater extraction and treatment system. The groundwater treatment system using UV/Oxidation is discussed above. The groundwater extraction system consists of a series of extraction wells located to pump and treat the more-concentrated portions of the groundwater contaminant plume. An anticipated flow of approximately 145 gpm will be withdrawn from the aquifer and treated at a MOM facility.

The added flow from the Valley/GRC property will be transferred to a MOM treatment facility via a buried conduit from the Valley/GRC extraction wells to the treatment facility that will be located adjacent to the Valley building. The addition of an anticipated flow of approximately 3 gpm from the Valley/GRC property, to the anticipated flow of 145 gpm to the MOM treatment facility, will not be significant. The flow from the Valley/GRC property contains highly contaminated water however, and this has been designed into the MOM treatment facility.

The EPA has performed a preliminary cost estimate for modifying both treatment facilities. Adding contaminated water from the Valley/GRC property to a MOM facility results in an increase of approximately \$400,000 to the life of the project. This should be compared with \$1,000,000, i.e., the cost to build and operate a groundwater treatment facility on the Valley/GRC property. (The above cost excludes the costs associated with installation of extraction wells, pumps and associated operation and maintenance of this equipment on the Valley/GRC property.)

Therefore, combining the flows from the Valley/GRC property with the MOM contaminated groundwater, and treating the groundwater at a single facility, yields a net savings of about \$600,000 less than the cost of building two (2) separate treatment facilities.

IV. SUPPORTING AGENCY COMMENTS

The Massachusetts Department of Environmental Protection ("MA DEP") believes that the UV/Oxidation has the potential to remediate the groundwater contamination on the Valley/GRC property and encourages the combining of contaminated groundwater into one treatment facility. A final determination from the MA DEP, which concurs with the remedial activities outlined in this ESD, is found in the Administrative Record File.

V. AFFIRMATION OF THE STATUTORY REQUIREMENTS

Considering the new information that has been developed and the change that has been made to the selected remedy, the EPA and MA DEP believe that the remedy remains consistent with the requirements of the ROD in that it remains cost effective and mitigates and minimizes damage to and provides adequate protection of public health, welfare, or the environment.

VI. PUBLIC PARTICIPATION ACTIVITIES

Notice That Administrative Record Is Available For Review

In addition to the public information meeting which was held on August 13, 1996, the proposed ESD and this final ESD, accompanied by any supporting information and analysis, is available for public review and can be found in the Administrative Record File. See Section I of this ESD for the addresses of the locations where this ESD is kept and maintained.

By: 
Linda M. Murphy, Director
Office of Site Remediation and Restoration

11/15/96
Date of Issuance

